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EXAMINER	
MCKANE, ELIZABETH L	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/766,614	SHIMP ET AL.	
	Examiner	Art Unit	
	Leigh McKane	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6,9-11,13-23,25,27,30-39,44 and 45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6,9-11,13-23,25,27,30-39,44 and 45* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 6, 9-11, 13-18, 25, 27, 30-32, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. (US 5,977,432) in view of Wolfinbarger, Jr. (US 5,976,104).

With respect to claims 1, 2, 10, 11, 13-18, 25, 27, 30-32, and 44, Wolfinbarger, Jr. et al. teaches a process for inactivating and reducing pathogens from a tissue (cancellous bone) having a longitudinal axis and a plurality of cavities. The longitudinal axis of graft **13** is the axis *of the graft* which has a length dimension that is greater than its other dimensions. The process includes centrifuging the tissue in a centrifuge with a pathogen solvent. See col.4, lines 21-34. The centrifuging will produce a G force on the graft in a direction parallel to the longitudinal axis of the graft **13**. After treatment with the solvent, the bone is dry spun (col.13, lines 46-48; col.15, lines 57-59). The solvent is hydrogen peroxide, an oxidant. See col.12, lines 20-25. In further steps, the bone is contacted with an antibiotic (col.11, lines 52-53). Wolfinbarger, Jr. et al. is silent with respect to continuously flowing the solvent solution to and away from the centrifuge during the centrifuging.

Wolfinbarger, Jr. ('104) teaches in another method of bone treatment wherein the solvent solution is flowed continuously to and way the treatment chamber, permitting complete removal

of the bone marrow and continuous monitoring of bone marrow removal from the graft. See col.7, lines 20-31

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a means to continuously introduce to and remove solvent from the centrifuge of Wolfinbarger, Jr. et al., in order to continually monitor removal of bone marrow from the graft of Wolfinbarger, Jr. et al. and effectively remove bone marrow from the graft. In fact, Wolfinbarger, Jr. et al. teaches that the purpose of centrifuging the bone graft is to remove the bone marrow from the graft (col.3, lines 5-8) and that complete removal of the bone marrow from the graft can be monitored "continually during the process" by measuring the absorbance of the solution. See col.10, line 66 to col.11, line 10.

As to claim 6, it is deemed obvious to one of ordinary skill in the art to choose an appropriate volume of solvent to employ based upon known parameters such as tissue size, centrifuge chamber size, and the amount of pathogen material present.

With respect to claim 9, Wolfinbarger, Jr. et al. discloses at 2500 rpm the G force is 1657. See col.12, lines 23-24. Using the equation used by Wolfinbarger, Jr. et al. to convert centrifuge rpm to G force (col.6, line 12) and the disclosed rpm range of Wolfinbarger, Jr. et al. yields a G force range of 247.5 to 6188 for centrifuge rotational speeds of 1000-5000 rpm.

3. Claims 19, 22, 23, 33, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. and Wolfinbarger, Jr. as applied to claim 17 above, and further in view of Morris et al. (WO 01/58497).

As to claims 19 and 33, Wolfinbarger, Jr. et al. teaches infusing the bone with a pathogen

reducing solution (hydrogen peroxide) during the step of centrifuging. In further steps, the bone is contacted with an antibiotic (col.11, lines 52-53). However, the infusion of a growth factor is not disclosed. Morris et al. discloses that it was known in the art to sterilize and impregnate with growth factor bone intended for transplantation. See page 1, first paragraph. As Wolfinbarger, Jr. et al. already discloses that the act of centrifuging the bone with the hydrogen peroxide causes permeation of the hydrogen peroxide through the bone, it would have been obvious to use the method of Wolfinbarger, Jr. et al. to impregnate the bone with other treatment components such as antibiotics and growth factor since Morris et al. teaches that doing so prepares the bone for a successful transplantation.

With respect to claims 22, 23, 36, and 37, Wolfinbarger, Jr. et al. is silent with respect to infusing the bone with a polymer. However, Morris et al. teaches the known infusion of bone with medically useful polymers, such as polymer cell scaffolds, polymeric carriers containing drugs, and bioerodable polymers. See page 9, lines 20-22 and page 10, lines 9-10. As these types of polymers are capable of promoting tissue growth and/or dispensing drugs *in vivo*, it would have been obvious to use the method of Wolfinbarger, Jr. et al. to infuse the bone with these polymers.

4. Claims 20, 21, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. (hereinafter 'Wolfinbarger '432') and Wolfinbarger, Jr. as applied to claim 17 above, and further in view of Wolfinbarger, Jr. et al. (US 6,293,970, hereinafter 'Wolfinbarger '970').

Wolfinbarger '432 fails to teach infusing the bone with a plasticizer. Wolfinbarger '970

discloses a process of sterilizing a bone graft followed by infusion with a plasticizer, such as glycerol. See col.7, line 42. The plasticizer is effective in improving graft brittleness and removes the necessity of graft rehydration prior to implantation. For these reasons, it would have been obvious to use the method of Wolfinbarger '432 to infuse the bone graft with a plasticizer.

5. Claims 33, 36, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. (US 5,977,432) in view of Morris et al. (WO 01/58497).

As to claim 33, Wolfinbarger, Jr. et al. teaches infusing the bone with a pathogen reducing solution (hydrogen peroxide) during the step of centrifuging. In further steps, the bone is contacted with an antibiotic (col.11, lines 52-53). However, the infusion of a growth factor is not disclosed. Morris et al. discloses that it was known in the art to sterilize and impregnate with growth factor bone intended for transplantation. See page 1, first paragraph. As Wolfinbarger, Jr. et al. already discloses that the act of centrifuging the bone with the hydrogen peroxide causes permeation of the hydrogen peroxide through the bone, it would have been obvious to use the method of Wolfinbarger, Jr. et al. to impregnate the bone with other treatment components such as antibiotics and growth factor since Morris et al. teaches that doing so prepares the bone for a successful transplantation.

With respect to claims 36, 37, and 39, Wolfinbarger, Jr. et al. is silent with respect to infusing the bone with a polymer. However, Morris et al. teaches the known infusion of bone with medically useful polymers, such as polymer cell scaffolds, polymeric carriers containing drugs, and bioerodable polymers. See page 9, lines 20-22 and page 10, lines 9-10. As these types of polymers are capable of promoting tissue growth and/or dispensing drugs *in vivo*, it

would have been obvious to use the method of Wolfinbarger, Jr. et al. to infuse the bone with these polymers.

6. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. (US 5,977,432) in view of Wolfinbarger, Jr. (US 5,976,104) and Morris et al..

Wolfinbarger, Jr. et al. teaches a method of centrifuging bone in order to remove contaminants therefrom while impregnating the bone with decontaminating agents, antibacterial agents, antibiotics, etc.. See col.6, line 15 to col.7, line 7. Wolfinbarger, Jr. et al. is silent with respect to continuously flowing the solvent solution to and away from the centrifuge during the centrifuging. Furthermore, Wolfinbarger, Jr. et al. does not disclose impregnating the bone with a growth factor.

Wolfinbarger, Jr. ('104) teaches another method of bone treatment wherein the solvent solution is flowed continuously to and from the treatment chamber, permitting complete removal of the bone marrow and continuous monitoring of bone marrow removal from the graft. See col.7, lines 20-31

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a means to continuously introduce to and remove solvent from the centrifuge of Wolfinbarger, Jr. et al., in order to continually monitor removal of bone marrow from the graft of Wolfinbarger, Jr. et al. and effectively remove bone marrow from the graft. In fact, Wolfinbarger, Jr. et al. teaches that the purpose of centrifuging the bone graft is to remove the bone marrow from the graft (col.3, lines 5-8) and that complete removal of the bone marrow from the graft can be monitored "continually during the process" by measuring the absorbance of the solution. See col.10, line 66 to col.11, line 10.

Morris et al. discloses that it was known in the art to sterilize and impregnate with growth factor bone intended for transplantation. See page 1, first paragraph. It would have been obvious to use the method of Wolfinbarger, Jr. et al. to impregnate the bone with growth factor since Morris et al. teaches that doing so prepares the bone for a successful transplantation.

7. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfinbarger, Jr. et al. (US 5,977,432) in view of Wolfinbarger, Jr. (US 5,976,104) and Peterson (US 5,730,933).

Wolfinbarger, Jr. et al. teaches a method of centrifuging bone in order to remove contaminants therefrom while impregnating the bone with decontaminating agents, antibacterial agents, antibiotics, etc.. See col.6, line 15 to col.7, line 7. Wolfinbarger, Jr. et al. is silent with respect to continuously flowing the solvent solution to and away from the centrifuge during the centrifuging or impregnating the bone with a radiation protectant.

Wolfinbarger, Jr. ('104) teaches another method of bone treatment wherein the solvent solution is flowed continuously to and from the treatment chamber, permitting complete removal of the bone marrow and continuous monitoring of bone marrow removal from the graft. See col.7, lines 20-31

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a means to continuously introduce to and remove solvent from the centrifuge of Wolfinbarger, Jr. et al., in order to continually monitor removal of bone marrow from the graft of Wolfinbarger, Jr. et al. and effectively remove bone marrow from the graft. In fact, Wolfinbarger, Jr. et al. teaches that the purpose of centrifuging the bone graft is to remove the bone marrow from the graft (col.3, lines 5-8) and that complete removal of the bone marrow

from the graft can be monitored "continually during the process" by measuring the absorbance of the solution. See col.10, line 66 to col.11, line 10.

Peterson teaches that it was known in the art at the time of the invention to use radiation to sterilize bone before use and to add a radiation protectant (scavenger) to the bone before irradiation thereof. See Abstract; col.3, line 45; col.4, lines 36-51. It would have been obvious to add the radiation protectant of Peterson to the bone of Wolfinbarger, Jr. et al. for subsequent sterilization since Peterson teaches that radiation sterilization offers a level of sterility unmatched by conventional methods and that the scavenger protects the bone from free radicals during sterilization. Moreover, one would have found it obvious to add a radiation protectant to the bone of Wolfinbarger, Jr. et al. during centrifuging, as Wolfinbarger, Jr. et al. teaches that the process of centrifuging is effective in moving fluids into and out of bone.

Allowable Subject Matter

8. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

9. Applicant's arguments filed 16 October 2007 have been fully considered but they are not persuasive.

10. On page 8 of the Response, Applicant argues that the combination of the '432 patent and the '104 patent is improper because the '104 patent does not disclose employing the method in

conjunction with a centrifuge. However, it seems that if the '104 patent did teach a centrifuge, it would be an anticipatory reference. Yet, anticipation is not required by any one reference where the rejection was made under §103.

Furthermore, while Applicant argues that there is no proper motivation to combine these two references, the Examiner disagrees. The '432 patent clearly teaches the desire to (a) remove all bone marrow from the graft, and (b) continuously monitor the presence of bone marrow in the cleaning solution. The '104 patent evidences the use of a continuous flow of solvent to and from the treatment vessel for a time period sufficient to achieve complete removal of the marrow from the graft as shown by continuous analysis of the effluent. Indeed the continuous introduction of solvent and removal of effluent disclosed by the '104 patent provides a means by which to continuously monitor the presence of bone marrow in the cleaning solution while removing bone marrow from the graft. The results of the combination are both predictable and apparent to one of ordinary skill in the art.

11. Applicant further argues that there is no reason to combine the '104 patent with the '432 patent because "the 432 patent explicitly teaches away from the use of solution flow, continuous or otherwise." However, what the '432 patent *actually* teaches against is the use of a pressurized flow of solution 'as a rapidly moving stream which dislodges bone marrow by impact'. This teaching has no bearing whatsoever on the use of a continuous flow of solution to and from the *centrifuge*. One in the art would not expect a continuous flow of solvent to and from the treatment vessel to be equated to 'a rapidly moving stream which dislodges bone marrow by impact.' They are two very difference processes.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh McKane whose telephone number is 571-272-1275. The examiner can normally be reached on Monday-Friday (5:30 am-2:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gladys Corcoran can be reached on 571-272-1214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leigh McKane

Leigh McKane
Primary Examiner
Art Unit 1797

elm
6 January 2008